

A MONOGRAPH OF THE GENUS *TISIPHONE* Hubner.

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(Plate 1.)

TISIPHONE Hubner.

Verzeichniss bekannter Schmetterlinge, p. 60, 1816.

Antennae less than half the length of costa, with clubs long, gradual and very slender. Eyes smooth. Forewing with vein 12 slightly, and median vein and vein 1a moderately swollen at base: vein 10 from subcostal close to end of cell: vein 6 longer than vein 5: cell more than half the length of wing. Hindwing with vein 3 and vein 4 arising well apart: cell about half the length of wing.

Type: Tisiphone abeona Donovan. *Range:* Eastern Australia.

The name *Tisiphone* was used by Hubner to include *zelinde* Hubner, *pasyphae* Esp., and *tulbaghia* Linn. The first is a synonym of *abeona*, the second is a European Satyrid and the third an African species which is not a Satyrid. Scudder rightly assigns *abeona* as the type of *Tisiphone*, though this name has been often used, even in Scitz' *Macrolepidoptera*, for a South American genus of Satyrids with type *hercyna* Huhner, a species which was not originally included by Hubner under *Tisiphone*. Kirby in 1902 replaced the name *Tisiphone*, so far as the South American species was concerned, by *Manataria*, retaining *Tisiphone* for *abeona*: this course Fruhstorfer agrees with in the Indo-Malayan portion of Scitz' *Macrolepidoptera*.

The forms of *Tisiphone* have unfortunately been placed in many and varied genera. Butler in 1866 described *joanna* under *Enodia*, and in 1868 placed this and *abeona* under *Xenica*. Kirby in his Catalogue placed both under *Epinephile*, a course which was followed by Miskin in 1876 with *rawnsleyi* and by Olliff in 1888 with *helena*. Since my Catalogue (1903) Australian Entomologists have been content to use the genus *Tisiphone*.

The butterflies are very local in their habits, never wandering far from their foodplant, and are all feeble fliers. I only recognise two species, *abeona* (with its five subspecies) and *helena*, but it is more than likely that *helena* will yet be connected with *abeona* when the forms of *Tisiphone* inhabiting the coastal ranges between Rockhampton and Cairns are known.

Though its foodplant is plentiful in Tasmania, *Tisiphone* is not known from there. It is evidently more recent than such genera as *Heteronympha* and *Xenica* which occur freely in Tasmania.

TISIPHONE ABEONA Donovan.

This species has five well marked races, which agree two and two, and a highly variable intermediate race. The races in the south only differ from each other in degree, and the same is true of *morrissi* and *rawnsleyi*, but *joanna*, occupying an intermediate locality, shows in one district a gradual change from the broad orange banded *abeona* to the narrow white banded *morrissi*.

It is suggested that *Tisiphone* was originally confined to the main dividing range and became differentiated concomitantly with the changes that gave rise to the low drier area through which the Hunter River flows. To the south of this area it developed the orange banded *abeona* and *albifascia* and to the north the narrow white banded *morrissi* and *rawnsleyi*: subsequently the species was able to reach the coast, and near Port Macquarie we have, in *joanna*, the result of the fusion.

The ovum is nearly spherical, smooth and green, and laid singly on the foodplant. The eggs that produce the spring brood are laid during March and April and even in May, according to latitude and altitude. Those that produce the autumn brood are laid during September, October, and even as late as November.

The young larva is pale yellow green with faintly darker green longitudinal dorsal lines, and with the head black. In the case of *joanna*, eggs laid in October took 13-15 days to emerge. The full grown larva is yellow green with fainter longitudinal dorsal lines and with ventral surface and head pale green. The head is rough, but without horns, the forked tail is prominent and the spiracles black: the body is devoid of hairs, slightly rough, and under examination with a lens is found to be marked with minute white dots. The larvae feed upon *Cladium* (sword or cutting grass) after dark, hiding during the daytime well down in the plant. Larvae of *joanna* were fully fed at the end of four months (November to February), but specimens that produce the spring brood spend at least one month longer in the larval stage.

The nupa is smooth, bright green, with wing-cases partially outlined in bright yellow: the head is furnished with two very short horns. Pupation usually takes place on the underside of the leaves of the foodplant or on surrounding shrubs. The pupal duration of the spring brood is 18-20 days in *albifascia* and *abeona*, and 22-25 days in the spring and 18-20 days in the autumn brood of *joanna*: the females usually pupate a week later than the males and remain as pupae two or three days longer.

The perfect insects predominate during September and October, and again in March and April, though these months may be extended in either direction according to latitude and altitude. Male specimens are to be found on the wing as early as the middle of September in the coastal districts from Sydney nearly to Rockhampton; farther south they do not appear until October and in the higher portions of the main Dividing Range are not to be found until November. Freshly emerged specimens are always much darker than those that have been on the wing some time: cabinet specimens also, to some extent lose the almost black colour of examples reared from the pupae.

T. ABEONA ALBIFASCIA Waterhouse.

Plate I., Figures 23, 27, 28.

Proceedings Linnean Society N.S. Wales 1904, p. 468.

This race differs from the typical in its broader and (especially in the female) paler orange markings above, and in its broader white markings beneath: the latter character is well seen by comparing fig. 22 with fig. 23. Fig. 23 is from a male caught at Macedon Vic. 31/1/1911, and fig. 27 and 28 are from larvae taken at Macedon during October 1912 that emerged in Sydney 27 and 28/12/1912. This race is found throughout Victoria and at Eden and Pambula in southern New South Wales.

T. ABEONA ABEONA Donovan.

Plate I., Fig. 21, 22.

Insects New Holland, pl. 22, f. 1, 1805: *Tisiphone zelinde*, Hubner.

Male. Above. Forewing rich dark brown: a broad central area from subcostal at half to tornus, orange: a narrow postcellular bar, orange: a subapical ocellus and a large subterminal ocellus between vein 2 and vein 3, black centred blue and with a whitish pupil. Hindwing rich dark brown: an obscure subapical and a large subterminal ringed ocellus, black margined dull red.

Beneath. Forewing dark brown: markings as above but paler: ocelli as above. Hindwing dark brown: a narrow discal band, white, and traces of a double subterminal line, cream: ocelli as above, that in apex not obscured.

Female. Above and beneath as in male: bands broader and paler.

This race can always be recognised from those specimens of *joanna* that approach it, by the less prominent subterminal ocellus of the hindwing above. Fig. 21 is from a male taken at Sydney 30/10/1913, and fig. 22 from a male caught in the Blue Mountains (2000ft.) 22/10/1913. This race inhabits the coast from Jervis Bay to the Hunter River, and also occurs in the Blue Mountains up to an altitude of 3000ft.

T. ABEONA JOANNA Butler.

Plate I., Fig. 1—14, 16, 17, 18, 26, 29, 30.

Annals Magazine Natural History 1866, p. 286: *l.c.* 1867, pl. 4, fig. 8.

Male. Above. Forewing dark brown: a bar near end of cell, and a narrow postcellular bar, obscurely yellowish: a subterminal patch, yellowish: a small subapical ocellus and a large subterminal ocellus between vein 2 and vein 3, black. Hindwing dark brown: an obscure discal line, cream: a subapical and a subterminal ringed ocellus, black margined orange-red.

Beneath. Forewing dull dark brown: a bar near end of cell and a narrow discal band, cream: ocelli as above but margined cream. Hindwing dull dark brown: a discal and a double subterminal line, cream: ocelli as above.

The above description is drawn up from a coloured drawing of the type in the British Museum and from Butler's original description. This type specimen was received at the British Museum in 1844 from the Entomological Club and bears an old label "Linn. Soc. N. Holland." It must have been caught at one of the early settlements established in Australia, probably at Port Macquarie.

At this place (Port Macquarie) I have recently captured a long series of *joanna*, including some nearly identical with the type: but as other specimens show almost every gradation between nearly typical *abeona* and nearly typical *morrisi*, I have thought it wise to give a large number of figures; all the specimens from which these figures were engraved were caught at Port Macquarie, excepting only fig. 26, and I would draw attention to the following details:—

Fig. 1. Male. Forewing, bands pale orange, nearly as broad as in *abeona*. Hindwing with a pale orange discal band (15/10/1913).

Fig. 2. Male. Forewing, bands broad and white. Hindwing with discal band incomplete, white (14/10/1913).

Fig. 3. Male. Forewing, bands very pale orange, cell spot obscure: subterminal patch nearly divided. Hindwing with discal band prominent, cream (12/10/1913).

Fig. 4. Male. Forewing with markings prominent as compared with fig. 9 (13/10/1913).

Fig. 5. Female. Bands broad, white: corresponds to fig. 2 (emerged from pupa in Sydney 29/11/1913).

Fig. 6. Male nearly as in fig. 1: hindwing without discal band (16/10/1913).

Fig. 7. Male nearly as in fig. 2: hindwing without discal band (14/10/1913).

Fig. 8. Male. Forewing without cell spot, markings pale orange. Hindwing with discal band very indistinct (11/10/1913).

Fig. 9. Male. Forewing markings narrower than in fig. 4: this is the underside of fig. 17 (11/10/1913).

Fig. 10. Female. Markings cream (15/10/1913)

Fig. 11. Male. Forewing without cell spot: markings narrow and white. Hindwing with discal band complete, white (16/10/1913).

Fig. 12. Male. Forewing with cell spot faint: subterminal patch divided. Hindwing with discal band complete and white (11/10/1913).

Fig. 13. Male. Forewing with cell spot: markings very pale orange (14/10/1913).

Fig. 14. Female. Forewing with cell spot faint (12/10/1913).

An egg from this specimen emerged on 26th October, attached itself to pupate on 15th Feb., 1914, became a pupa on 17th Feb., and a male emerged on 6th March 1914. This male differs from the forewing of fig. 18 only in the absence of the cell spot, and agrees closely on the hindwing with fig. 11.

Fig. 16. Male. Forewing with cell spot faint: markings very close to type (12/10/1913).

Fig. 17. Male. Approaching *ravensleyi* (11/10/1913).

Fig. 18. Male. Forewing with cell spot faint: subternal spot large and cream. Hindwing with discal band narrow and incomplete (14/10/1913).

Fig. 26. Male. Very close to *abeana*: differs in the more prominent subternal ocellus of hindwing above, which is much more prominent than shown in figure (Cooperbrook 22/10/1913).

Fig. 29. Male. Forewing markings faintly tinted orange. Hindwing markings cream (12/10/1913).

Fig. 30. Male. Markings cream (20/10/1913).

These figures are from selections from about one hundred specimens of *joanna* all taken within a few days and within eight miles of the Port Macquarie Post Office. No one type of variation was confined to a particular area of swordgrass, and orange forms were among those taken from an area on the northern, as well as from areas on the southern bank of the Hastings River. At Camden Haven twenty miles south of Port Macquarie, the only two specimens caught were orange forms, and the four specimens from Cooperbrook another twenty miles south were also orange forms and greatly resembled *abeana*; a pair from Tuncurry and a single specimen from Port Stephens also differ from *abeana* in the larger subternal ocellus on the hindwing above, and are very close to orange specimens caught at Port Macquarie.

All specimens of this race that might be mistaken for typical *abeana* may be recognised by the very prominent subternal ocellus on the hindwing above. I can find very little to distinguish two or three male specimens from the more northerly *morrissi*, excepting that they usually show a cell patch on forewing above, which I have never seen in *morrissi*, and the band of the hindwing is narrower than in *morrissi*: I have no females that would be mistaken for *morrissi*.

This race I regard as a composite one made up of every intergrade between two stable races, with the characters combined in varying degree. It is probable that this variable subspecies is confined to the coastal districts only and will not be found in the adjacent portion of the Dividing Range.

T. ABEONA MORRISI *nov.*

Plate I., fig. 19, 24, 25.

Male. Above. Forewing dark brown: a narrow postcellular bar and a subternal patch, white: a subapical ocellus and a large subterminal ocellus between vein 2 and vein 3, black faintly margined white. Hindwing dark brown: a broad irregular discal band, white: a subapical and a larger subternal ringed ocellus, black broadly margined dull orange-red.

Beneath. Forewing dull dark brown: a bar near end of cell, a narrow postcellular bar, and a small subternal patch, white: traces of a double subterminal line, white: ocelli as above, ringed white. Hindwing dull dark brown: ocelli and discal band as above: traces of a double subterminal line, white.

Female. Above as in male: subternal patch of forewing much broader: sometimes traces of a double subterminal line, white.

Beneath as in male: white markings broader: double subterminal lines much clearer.

Named in memory of the late J. F. Morris, B.E., through whose efforts I was enabled to capture my first specimens. This subspecies is only slightly variable: examples from Dorrigo and Ebor are larger and their white markings are broader than those from the Richmond River: one female from Dorrigo shows faint traces of a cell spot on forewing above. Fig. 19 is a female (Ballina 5/2/1898), fig. 24 is a male (Ballina 20/9/1902), and fig. 25 is also a male (Ballina 11/10/1902). This race ranges from the Bellinger River to Southport in southern Queensland, and on the Dividing Range near Ebor is taken up to 4000ft.: it has at various times been distributed as *T. joanna* Butler.

T. ABEONA RAWNSLEYI Miskin.

Plate I., fig. 15, 20.

Transactions Entomological Society, London, 1876, p. 454.

This is the most northerly race of *abeona* yet discovered. My specimens are from Caloundra, Nambour and Eumundi, all in southern Queensland: the limit of its range to the north is undetermined. In this subspecies the pale markings above have almost disappeared: only occasional females show a faint discal band on hindwing above.

Fig. 15 is a male from Nambour (Oct. 1910), and fig. 20 is a male from Eumundi.

TISIPHONE HELENA Olliff.

Proceedings Linnean Society N.S. Wales, 1888, p. 395.

Male. Above. Forewing brown, suffused golden brown: a broad discal area from costa at two-thirds to tornus, pale yellow shading to golden brown: apex, termen, and basal edge of discal band to vein 2, dark brown: a white pupilled subapical ocellus, and a large white-pupilled subterminal ocellus between vein 2 and and vein 3, black. Hindwing brown: termen lined dark brown: a subapical ocellus, black, and a white-pupilled subterminal ocellus, black narrowly margined golden brown.

Beneath. Forewing as above but paler: a bar across cell at two thirds and margins of discal area to vein 2, dark brown: termen lined dark brown: ocelli as above. Hindwing brown: a basal, a discal, and a double subterminal line, red-brown: a large subapical and a subterminal ringed ocellus, black narrowly margined golden brown.

Female. Above and beneath as in male: usually larger.

This species occurs above an altitude of 1000ft., and chiefly in January and February, in the Cairns District of northern Queensland. It is usually found in the neighbourhood of *Cladium*, upon which I have no doubt the larvae feed, though I have not yet been able to discover either larvae or pupae. Its range both to north and south of Cairns is undetermined: the type came from Mt. Bellenden Kerr.

